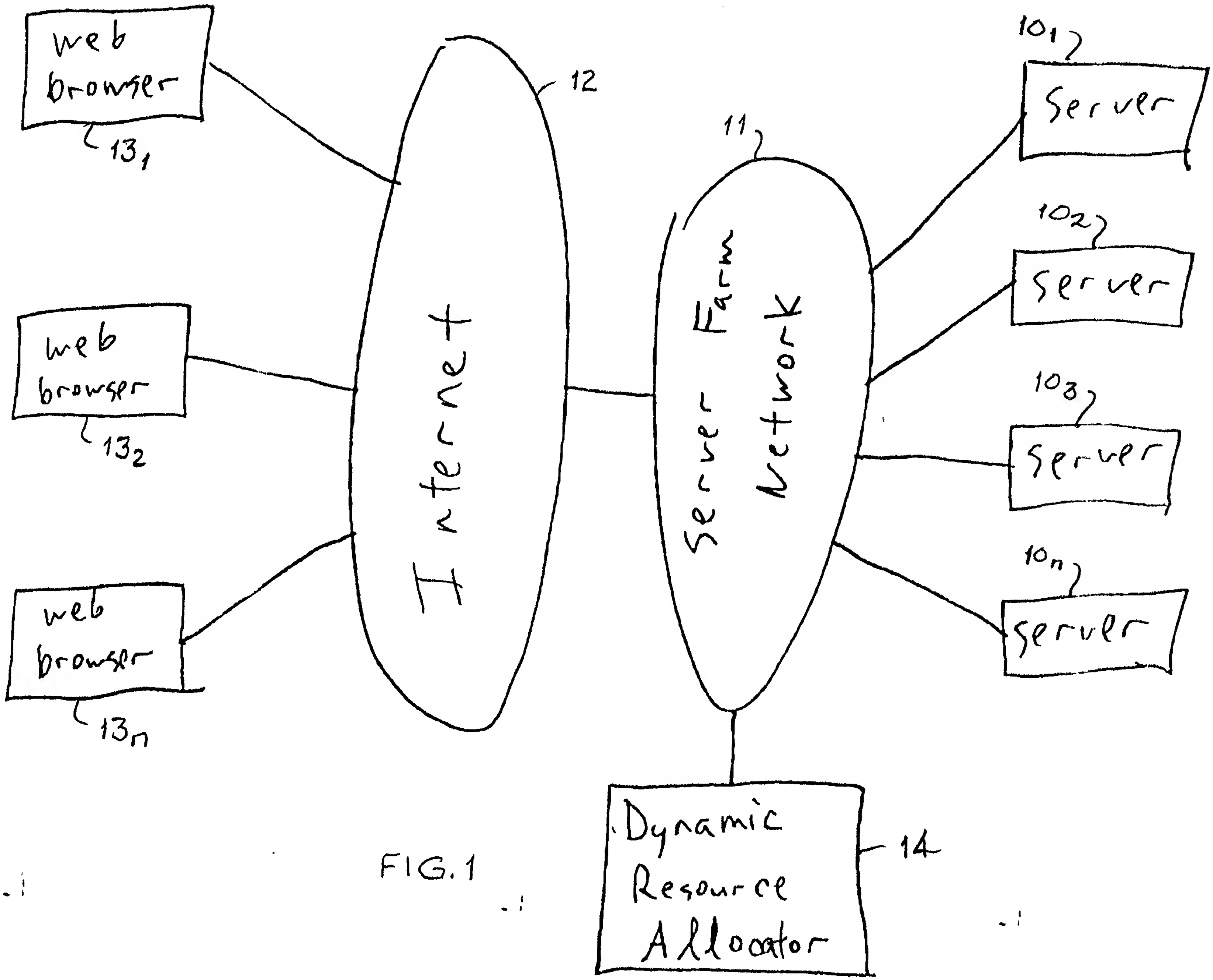
web browser
13_1
web browser
13_2
web browser
13_n
Internet
12
11
Server Farm Network
10_1
Server
10_2
Server
10_3
Server
10_n
Server
Dynamic Resource Allocator
14

FIG.1

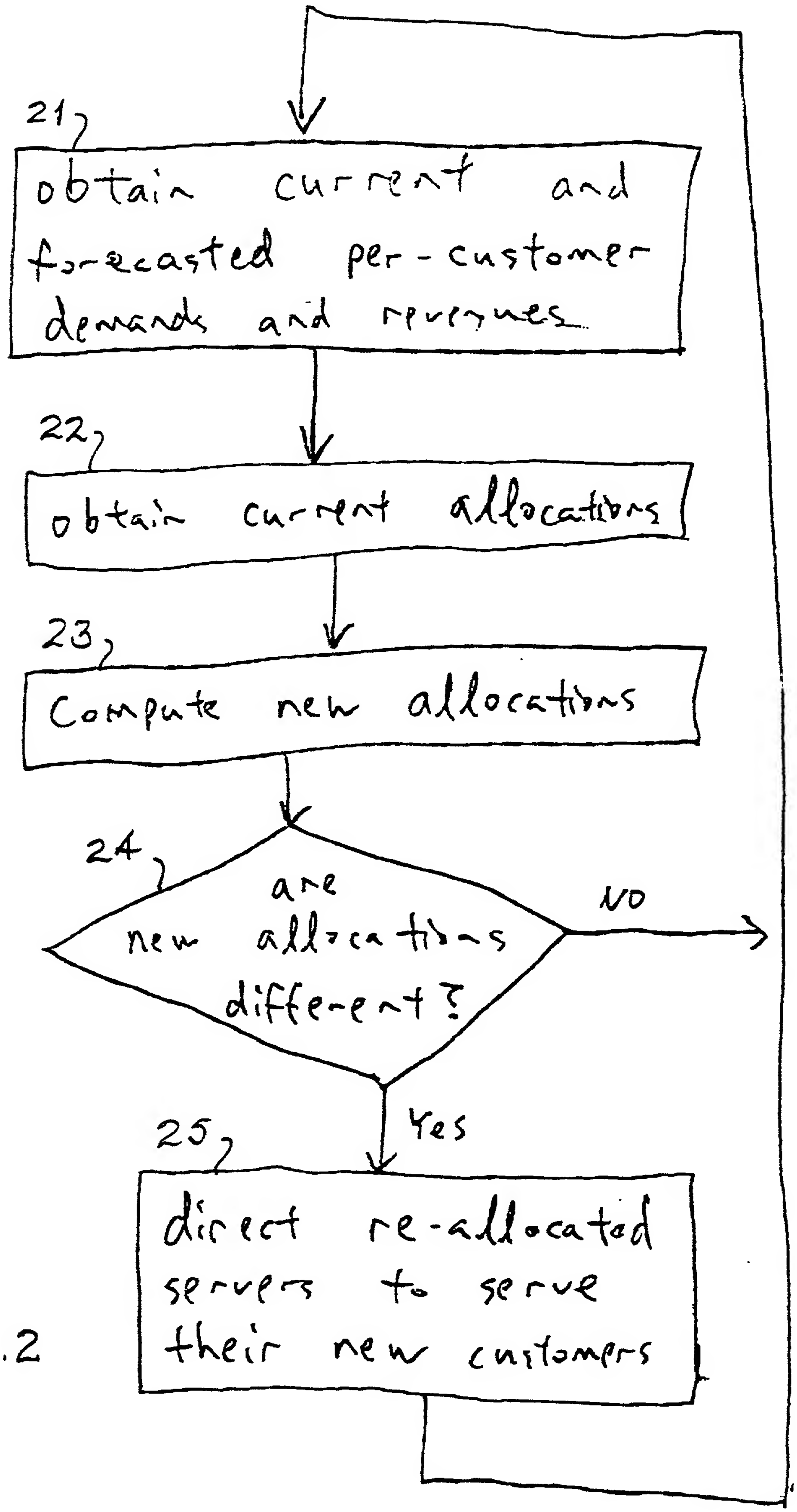
21
obtain current and forecasted per-customer demands and revenues
22
obtain current allocations
23
Compute new allocations
24
are new allocations different?
NO
Yes
25
direct re-allocated servers to serve their new customers

FIG.2

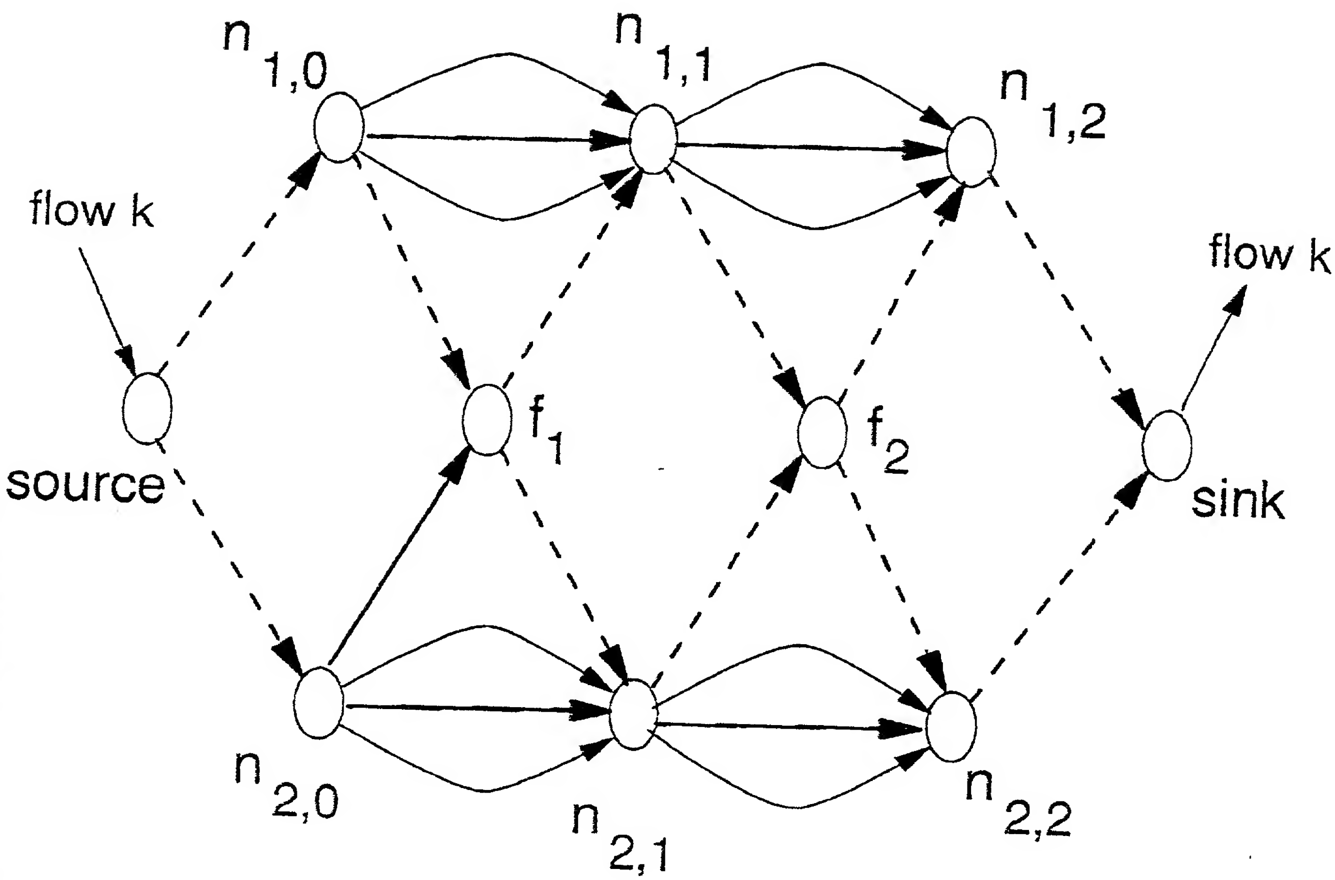
n 1,0
n 1,1
n 1,2
flow k
flow k
f 1
f 2
source
sink
n 2,0
n 2,1
n 2,2

FIG. 3

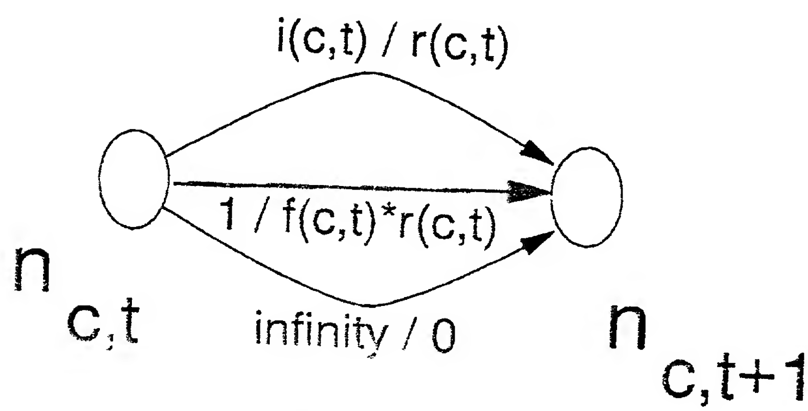
i(c,t) / r(c,t)
1 / f(c,t)*r(c,t)
infinity / 0
n c,t
n c,t+1

FIG. 4

501 Let max_time denote the number of time periods. Construct a flow network as follows. For each customer c and time period t, construct three parallel edges e1(c,t), e2(c,t), and e3(c,t) from node n(c,t) to node n(c,t+1). Construct edges from n(c,t) to free(t) and from free(t) to n(c,t+1). Construct edges from source to each n(c,1) and from each n(c,max_time+1) to sink.

↓

502 For each customer c and time period t, do the following: Let i(c,t) denote the integer part of the customer's demand for the time period, and let f(c,t) denote the fractional part.
Set capacity(e1(c,t)) = i(c,t) and benefit(e1(c,t)) = r(c,t).
Set capacity(e2(c,t)) = 1 and benefit(e2(c,t)) = f(c,t)*r(c,t).
Set capacity(e3(c,t)) = infinity and benefit(e3(c,t)) = 0.

↓

503 For each time period t, do the following:
Set capacities of all edges to and from free(t) to infinity.
Set benefits of all edges to and from free(t) to 0.

↓

504 Set capacities of all edges to sink and from source equal to infinity. Set benefits of allsuch edges to 0.

↓

505 Find a maximum benefit maximumflow of volume equal to the number of servers from source to sink in the constructed network using existing art.

↓

506 Set the allocations of servers to customers equal to the flows present on edges among a customer's nodes in the corresponding time periods. Similarly derive transitions between allocations from the flows present on the edges to and from the free pool nodes.

FIG. 5